

WHAT IS CLAIMED IS:

1. A method for managing radio frequency (RF) transmissions from an RF system of at least one mobile platform operating within a predetermined coverage region to a space-based transponder orbiting within said coverage region, in a manner to maintain a signal-to-noise ratio ( $E_b/N_o$ ) of said RF transmissions within a predetermined range, the method comprising the steps of:

using a first control loop to monitor, by a central controller, a signal-to-noise ratio of said RF transmissions received by said satellite transponder, and to transmit commands to said mobile platform via said satellite transponder for maintaining said signal-to-noise ratio within a predetermined range; and

using a second control loop including a mobile system of said mobile platform to monitor and adjust a power level of said RF transmissions to said satellite transponder, inbetween receipt of said commands from said central controller, to thereby maintain said power level of said RF transmissions at a previously commanded level, inbetween receipt of updated command signals from said central controller.

2. The method of claim 1, wherein said predetermined signal-to-noise range comprises a range of about 1dB.

3. The method of claim 1, wherein said predetermined signal-to-noise range is above a threshold signal-to-noise ratio of said central controller.

4. The method of claim 1, further comprising the step of using said central controller to determine if said RF transmission from said mobile platform remains outside of said predetermined signal-to-noise ratio for more than about one second and, if so, commanding the mobile platform to cease said RF transmissions.

5. The method of claim 1, wherein the step of monitoring by a central controller comprises monitoring by a ground-based central controller located within said coverage region.

6. A method for managing radio frequency (RF) transmissions from an RF system of at least one mobile platform operating within a predetermined coverage region to a space-based transponder orbiting within said coverage region, in a manner to maintain a signal-to-noise ratio ( $E_b/N_o$ ) of said RF transmissions within a predetermined range, the method comprising the steps of:

using a first control loop to monitor and adjust a power level of said RF transmissions to maintain same within said predetermined range, said first control loop including the steps of:

receiving said RF transmissions at a central controller;

using said central controller to determine a signal-to-noise ratio of said RF transmissions received by said satellite transponder;

comparing said determined signal-to-noise ratio with predetermined signal-to-noise values representing said predetermined range; and

transmitting commands representing changes in said signal-to-noise ratio from said central controller to said space-based transponder, and from said space-based transponder to said mobile platform, to thereby command said mobile platform to adjust a power level of its said RF transmissions, in real time, to maintain said signal-to-noise ratio of said RF transmissions within said predetermined range.

7. The method of claim 6, further comprising using a second control loop between said mobile platform and said satellite transponder to monitor and maintain

said signal-to-noise ratio at a previously commanded level, said second control loop including the steps of:

monitoring said signal-to-noise ratio of said RF transmissions between said mobile platform and said satellite transponder; and

inbetween said commands from said central controller, adjusting said power level of said RF transmissions to maintain said power level at said previously commanded level determined by said central controller.

8. A method of determining a power spectral density (PSD) of an RF signal from a mobile platform having an RF transmitter/receiver directed at a space-based transponder, said method comprising the steps of:

using a central controller to receive and determine a signal-to-noise ratio of said RF signal transponded from said space-based transponder;

assuming that said signal-to-noise ratio of said RF signal received by said central controller is approximately identical to a signal-to-noise ratio of a RF signal at an output of said space-based transponder;

determining an effective isotropic radiated power (EIRP) value of an RF signal directed at said space-based transponder by said mobile platform as a function of said signal-to-noise ratio of said RF signal received by said central controller, and denoting said EIRP value as a target EIRP;

using said target EIRP and a pattern of an antenna of said mobile platform to determine an actual EIRP reaching a GEO arc within which said space-based transponder resides; and

using said actual EIRP reaching said GEO arc to determine said PSD of said RF signal being transmitted by said mobile platform.

9. A system for monitoring and controlling a power spectral density of an RF signal from a mobile platform having an RF transmitter/receiver directed at a space-based transponder, the system comprising:

a scan angle compensator system for monitoring a power level of a signal transmitted from said RF transmitter/receiver of said mobile platform, wherein said power level varies due to changes in an attitude of said mobile platform, and for adjusting said power level of said signal transmitted from said RF transmitter to minimize fluctuations of said power level when said signal is received by said space-based transponder.

10. The system of claim 9, wherein said system comprises an open loop system which compares antenna pointing information generated by an onboard reference system with information contained in a prestored table, and modifies said power level of said signal in accordance with said information contained in said prestored stable.

11. The system of claim 9, further comprising a ground loop controller for measuring a signal quality of said signal when said signal is received from said satellite transponder at a ground station, and for generating a power correction command signal that is transmitted back to the mobile platform via said satellite transponder.

12. The system of claim 11, wherein said ground loop controller comprises a closed loop system.

13. The system of claim 11, wherein said ground loop controller only transmits said power correction command signals when a signal quality value of said signal differs from a desired predetermined value by a predetermined amount.

14. The system of claim 11, wherein said power correction command signal represents an increment value by which said power level of said signal is to be modified.

15. A system for monitoring and controlling a power spectral density of an RF signal from a mobile platform having an RF transmitter/receiver directed at a space-based transponder, the system comprising:

a ground loop controller for measuring a signal quality of said signal when said signal is received from said space-based transponder at a ground station, and for generating a power correction command signal that is transmitted back to the mobile platform via said space-based transponder, to thereby maintain said power spectral density of said signal within a predetermined limit.

16. The system of claim 15, wherein said ground loop controller comprises a closed loop system that compares a signal quality of said signal received at said ground station to a predetermined value and generates said power correction command based on a difference in signal quality between said received signal and said predetermined value.



17. The system of claim 15, further comprising:

a scan angle compensator system for monitoring a power level of a signal transmitted from said RF transmitter/receiver of said mobile platform, wherein said power level varies due to changes in an attitude of said mobile platform, and for adjusting said power level of said signal transmitted from said RF transmitter to minimize fluctuations said power level when said signal is received by said space-based transponder.

18. The system of claim 17, wherein said scan angle compensator comprises an open loop system which compares attitude information generated by an onboard inertial reference system with information contained in a prestored table, and modifies said power level of said signal in accordance with said information contained in said prestored stable.